

## **REMARKS**

### **Amendments to the Claims**

Claims 1-14 are herein cancelled. New claims 15-21 are added. Support for claims 15-21 is found in the Specification at page 5, line 15; page 7, lines 10-15; page 6, line 30; page 6, lines 10-21 and page 8, lines 12-18.

No new matter has been added.

### **Claim Rejections Under 35 U.S.C. § 102(b)**

#### **A. Van Dorp**

The Examiner rejects claims 1, 2, and 5-14 under 35 U.S.C. § 102(b) as being anticipated by van Dorp (U.S. 3,686,003). Applicants respectfully traverse.

First, with regard to claims 1, 2, and 5-14, the rejection is moot as these claims have been cancelled.

Second, with regard to new claims 15-21, the Examiner's assumption that a "savory flavor" is equivalent to a "body taste improving flavor" is not accurate. The term "body-taste" has been translated from a Japanese term that may be transliterated into "KOKUMI". KOKUMI is recognized in the food arts, referring to taste reinforcement accompanied by thickness, continuity and mouthfulness, as shown on page 810, left column, lines 3-7 of T. Yamamoto et al., Chem. Senses 34: 809-818, 2009 and on page 64 right column, lines 24-32 of FOODTECHNOLOGY, August 2004, Vol. 58, No.8, p. 56-69 (both attached). This is supported by the teachings of the Specification, page 9, beginning at line 26, describing the sensory test. Thus, the body-taste discussed in the Specification is not a "savory" taste associated with chicken or other meat.

Instead, the flavor of food is dependent on multiple characteristics, including the composition of the fatty acids in the food or any additives, the volatility of the compounds derived from oils (excluding or including any additives), and the content of the food itself.

To begin, the substance of van Dorp is chemically different from the substance obtained by the presently claimed method. More particularly, the composition of representative fatty acids is very different between vegetable oils (such as corn oil and canola oil), and animal oils (such as chicken oil). This is demonstrated in the table below.

Fatty acid % in Total Triglyceride

	saturated	oleic C18:1	linoleic C18:2	linoleic C18:3	arachidonic C20:0
Chicken 1	32.2	28.8	31.4	1.53	1.53
Chicken 2	23.4	46.1	24.7	0.82	0.6
Chicken 3	30.3	45.2	18.1	0.98	0.58
Corn	13.1	24.9	60.6	0.9	~
Canola	6.8	67	21.5	1.6	—

Chicken: JAACS, 29, 334-338 (1952)

Corn: JAACS, 62, 1675-1679 (1985)

Canola=Low linolenic acid canola oil : JAACS, 66, 1081-1084 (1989)

Thus, at the outset, the composition of a substance obtained from vegetable fat and oil which is decomposed (even if it includes a decomposed arachidonic acid or  $\gamma$ -linolenic acid) would be different from a substance obtained from chicken fat and oil which is decomposed, even if decomposed arachidonic acid or  $\gamma$ -linolenic acid were added.

In addition, the flavors between the substance described in van Dorp and the substance obtained with the present inventive method would be different. The flavor of chicken (and other species-specific flavors) is generally derived from lipids. These lipids may be degraded via thermal and oxidative reactions to have sensory effects (see, for example, page 1197, right column, lines 4-8 and 13-16 of Taylor and Larick (1995) J. Food Sci. 60(6):1197-1200; attached).

Thus, van Dorp's reference to enhanced "chicken flavor" is partially derived from the chicken fat that the aliphatic aldehyde compound is added to. Therefore, since the claimed methods describe compositions which are based on a decomposed substance of vegetable fat and oil, van Dorp does not describe the KOKUMI flavor obtained through the addition of the compositions of the claimed method.

The examples in the van Dorp reference relating to altering the flavor of foods, such as the soup in Example 20, have chicken meat and chicken fat already present before the addition of arachidonic acid. In these cases, the soup is described as "having only a weak flavor of chicken" (van Dorp, column 7, lines 45-49). The purpose of adding arachidonic acid is to give a "more marked chicken flavor" to the soup (van Dorp, column 7, lines 45-49). Van Dorp also discusses producing a similar soup of "excellent chicken flavor" where the chicken fat (3.0 g) is first mixed with 0.18 cc of 10% ethanol solution of arachidonic acid (90% pure) (van Dorp, column 7, lines 68-72). Thus, the soups of van Dorp merely emphasize a flavor which is already present in their soups. Because the present invention does not include the chicken meat or chicken fat, the flavor is different from the body taste (KOKUMI) flavor of the claimed methods.

In summary, as discussed above, the composition of the substances added in the claimed method are different from those in van Dorp, and the taste of those substances is therefore also different.

The perception of taste is further altered by the volatility of oils in food. The below Table presents the volatile compounds that are generated via thermal and oxidative reactions and which are present in vegetable oil, as represented by corn oil, and arachidonic acid (shadowed columns). Clearly, the two oils have very different compositions, sharing only 4 of a total of 41 substances. As can be seen from the "total flavor description" of corn oil versus arachidonic oil, to one skilled in the art this essentially means that vegetable fat and oil without the addition of arachidonic acid never produces a chicken flavor. Thus, the claimed methods are different from

those described in van Dorp; here, the resultant product produces a taste which is new rather than merely emphasizing a taste already present in the food.

Volatile compound <sup>c,d</sup>	Reported odor description <sup>a,c</sup>	Reported odor threshold in oil (mg/kg) <sup>a</sup> (mg/L) <sup>b</sup>	Reported aroma intensity <sup>f,*</sup> scale from 1(low) to 3(high)	corn <sup>d</sup>	AA <sup>c</sup>
				total flavor description	
				Nutty <sup>g</sup> Buttry Corn Burnt Rancid Painty Off flavor	Cooked chicken <sup>e</sup>
Ethane					
Propane					
Propanal					
Pentene		340 <sup>a</sup>			
Pentane					
Propanal					
Pentene					
Hexane					
2-butenal					
1-penten-3-ol					
Pentanal					
Heptane					
Pentanal	Painty,herbal	0.07 <sup>a</sup>			
Pentanol					
Octen					
Hexanal	Fatty, green, fruity, cut grass, herbal, rancid, painty, crushed weeds	0.12 <sup>a</sup> 0.3 <sup>b</sup>	3		
Octane					
Octene					
t-2-hexanal					
Heptanal	weeds, green, sour, sweaty, herbal, painty, rancid	0.055 <sup>a</sup>			
c-2-heptanal					
t-2-heptenal					
1-octen-3-ol	mushroom-like		2		
pentyl fran					

t,c-2,4-heptadienal	fatty, natty				
Octanal	Lime, grassy, citrus, sharp, heavy, candle-like, crushed weeds	1.5 <sup>a</sup>			
t,t-2,4-heptadienal	fatty, nutty				
Octenal					
Nonanal	Green, soapy, rubbery, beany				
Dodecane					
t-2-decenal					
Decenol					
t,c-2,4-decadienal	soapy	0.004 <sup>b</sup>	2-3		
t,t-2,4-decadienal	fatty	0.18 <sup>b</sup>	2		
Undecenal					
1-octen-3-one	mushroom-like	0.01 <sup>b</sup>	3		
c-2-octenal	soapy		2		
t-2-octenal	soapy		2		
c-2-nonenal	soapy		2		
t-2-nonenal	soapy		2		
t,c-2,4-nonadienal	soapy		2		
t,t-2,4-nonadienal	fatty		2-3		
2,5-undecadienal	soapy		3		
t-4,5-epoxy-t-2-decenal	metaric, green	0.0013 <sup>b</sup>	3		
t,c,c-2,4,7-tridecatrienal	egg-white-like, marine	0.18 <sup>b</sup>	3		
t,t,c-2,4,7-tridecatrienal	animal, beefy		2-3		
t,t,t-2,4,7-tridecatrienal	animal, pig-like		2		
unknown	green, metallic				
unknown	soapy, geranium-like				

a) JAOS, 73, 1154-1160 (1996)

b) Lipids, 36, 749-756 (2001)

c) J. Agric. Food Chem. 49, 2959-2965 (2001)

d) JAOS, 62, 1675- 1679 (1985)

e) JAOS, 51, 356-359 (1974)

f) Frontiers of flavor science pp3-9 (2000)

g) JAOS, 73, 157-166 (1996)

\* Intensity perceived at the sniffing port, on a scale from 1(low) to 3(high)

The factor which has the greatest influence on flavor is odor sensed through detection of volatile compounds. If a food has no odor, its flavor is gone and it is experienced primarily in terms of bitter, sweet, sour and salt. (See Zhou et al. (1999) J. Food Chem, last two sentences of Introduction, attached). Considering this in view of the third column in the above Table, it is clear that the volatile compounds derived from arachidonic acid do not have a significantly lower odor threshold and so their flavor is not much stronger than that of the volatile compounds from vegetable oil. Moreover, the difference between the volatile compounds of corn & arachidonic acid in the Table above also demonstrates what flavors are added to a vegetable oil with the addition of arachidonic acid, and the intensity of the flavors. The present invention mixes an n-6 long-chain highly unsaturated fatty acid with vegetable fat and oil in such a small amount (i.e. 10-10,000 ppm (1%)) followed by oxidization treatment. As a consequence, the addition of n-6 or n-3 long-chain highly unsaturated fatty acids such as arachidonic acid will not produce any chicken flavor in the vegetable fat and oil. Instead, a new total or mixed flavor is generated in the vegetable fat and oil that is different from the original flavor, due to the volatile compounds derived from the arachidonic acid or other n-6 or n-3 long-chain highly unsaturated fatty acid which has been introduced.

As can be seen from the above, the vegetable fat and oil is never just a carrier for the n-6 or n-3 long-chain highly unsaturated fatty acid and/or an ester. The addition of this n-6 or n-3 long-chain highly unsaturated fatty acid and/or an ester will not simply emphasize a flavor that is already present in the vegetable fat and oil. Neither will the vegetable fat and oil simply take on the flavor of the added n-6 or n-3 long-chain highly unsaturated fatty acid and/or ester, as suggested in van Dorp.

The new flavor that is generated as the total or mixed flavor is the combination of all of the aromatic compounds in the above table, whereas the flavor obtained in van Dorp would include only those compounds of arachidonic acid, which are additive to the flavors of chicken soup. Thus, the composition of van Dorp and the composition obtained with the claimed method are different, and as a consequence, taste different.

Accordingly, Applicants submit that the Examiner has failed to establish that the van Dorp reference anticipates the claimed method. Applicants request that the rejection not be applied to the new claims.

### **B. Simmons**

The Examiner rejects claims 1-4, 6, 7, and 10 under 35 U.S.C. § 102(b) as being anticipated by Simmons (EP 0463660). Claims 1-4, 6, 7, and 10 have been cancelled, rendering the rejection moot.

Furthermore, the Simmons reference does not disclose an n-6 long-chain highly unsaturated fatty acid. In particular, "linolenic acid," when described as such, generally means the  $\alpha$ -linolenic acid (an n-3 long-chain highly unsaturated fatty acid) rather than the  $\gamma$ -linolenic acid described in the Specification. The Examiner's use of the Specification to support the teachings of the prior art is inappropriate. Thus, the linolenic acid of Simmons, conventionally understood to be  $\alpha$ -linolenic acid does not anticipate the n-6 long-chain highly unsaturated fatty acid of the claims. Accordingly, Applicants submit that for *at least this reason*, the prior art reference fails to teach every limitation of the claims. Applicants submit that the rejection should not be applied to the new claims.

### **Claim Rejections Under 35 U.S.C. § 103**

The Examiner rejects claims 3 and 4 under 35 U.S.C. § 103 as being unpatentable over van Dorp. As discussed above, claims 3 and 4 have been cancelled, therefore the rejection is moot. Moreover, the rejection should not be applied to the new claims 15-17 for the reasons discussed above.

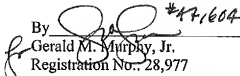
In view of the above amendment, Applicants believes the pending application is in condition for allowance.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Susan W. Gorman, Ph.D. Reg. No. 47,604 at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37.C.F.R. §§1.16 or 1.17; particularly, extension of time fees.

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Respectfully submitted,

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Attachments: Yamamoto et al.  
FOODTECHNOLOGY 2004  
Taylor et al.  
Zhou et al.